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ABSTRACT

To determine whether the current concentration of funding awards to faculty at top ranked institutions is justifiable, the individual characteristics of faculty and productivity characteristics were analyzed by institutional type. Based on American Council on Education 1972-1973 data, a stratified sample of 2,530 faculty who held Ph.D.s and were employed at 301 American four-year institutions were studied. The Carnegie Classifications of Institutions of Higher Education was used to classify the institutions as either "top 60," "second-tier," or "other." Attention was directed to predegree background factors (e.g., sex, age, race, and parents' education); preaffiliation academic factors; career goal elements (e.g., tenure, salary, rank, teaching/research time factors); and attitudes. Individual background data did not effectively predict institutional affiliation. However, institutions had an important effect on the professional placement and growth of academics. Productive individuals, wherever they were employed, were found to have similar characteristics. It is suggested that the findings support the view that funding should be more broadly-based in order to promote excellence in individuals regardless of institution of affiliation. (SW)

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INDIVIDUAL CHARACTERISTICS, INSTITUTIONAL AFFILIATION AND PRODUCTIVITY: A CASE FOR REVIEW OF FUNDING POLICIES

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Within the scientific research community there has been lasting doubt and continued debate concerning funding efficacy. The subject has been debated on the grounds both of geographic concentration of funding and of institutional concentrations. Each of these areas of debate has, through the emphasis given them, become statistically well-documented. It has been shown, for example, that 43,6% of the total funding for research is concentrated in only 3 states: California, New York, and Massachusetts ("Geographic Concentration of Funds" draft, 1981). A similar pattern holds true for research funding at top universities and colleges. In 1979, the nation's 100 leading universities and colleges received 71% of all Federal support ("Federal Science Funding", 1982). There has been a steadily growing concern with what has been termed the monopolistic nature of these funding practices. Coupled with this concern is the recognition that the realities of today's job market for newly-trained researchers are such that in all likelihood these scientists will not be able to secure positions at leading universities. This situation implies that scientists with the most recent training will be forced to accept positions at institutions which offer little in the way of research support either through equipment and laboratory facilities or through these institutions' ability to attract

research funding. The "loss" of these scientists' talents to the nation's research efforts provides a sound basis for proposing a wider distribution of research funds. Some efforts in this direction have been initiated by federal agencies such as the National Science Foundation's EPSCOR (Experimental Program to Stimulate Competitive Research) program which is designed to assist in building science capabilities in nontraditional settings (Drew, 1982).

Differentiation by Individuals

Inasmuch as it has been established that there are both differential rankings of institutions as well as a tendency to fund differentially, the problem then becomes one of determining those factors, or elements, which contribute to this difference. What can be seen to produce such seeming differences amongst institutions of higher education and the faculty at these institutions? In what ways are the characteristics of individuals at one of the nation's leading institutions different from the characteristics of individuals at less distinguished universities? Are we able to state, as based on research findings, that there are distinct and predisposing differences amongst individuals which either warrant or suggest differential treatment and funding processes? Although these specific questions have not been addressed in the literature, scholars have looked at the relationships of productivity, grant getting, and institutional affiliation of various populations, in various combinations,

and with various results. In the process of isolating factors which contribute to productivity and thereby relate to other aspects of institutional purpose such as grant getting and institutional affiliation, distinct emphases and interpretations have been put forth by researchers of the area. Generally it has been noted that little overall consensus has been produced as a result of these efforts. This lack of consensus arises partly from the fact that questions concerning the nature of productivity are addressed by emphasizing different aspects or views of productivity.

Within the areas of emphases, however, there has been fairly good consensus concerning the theories which have been generated. For example, productivity has been looked at in terms of the personal abilities of the scholars. Early work by Meltzer (1949) determined that career productivity could be related to early productivity as measured by age at Ph.D. and first publication. Meltzer's work has been generally well-supported by the subsequent work of Cole and Cole (1967), Long (1978), Long, Allison, and McGinnis (1979) as well as others. Complementary studies by such researchers as Aran and Ben-David (1978), Cole and Cole (1973), Simon (1974), and Hargens (1978) have indicated that early productivity can be attributed to psychological characteristics which are seen as predisposing individuals to a general commitment to research. These characteristics were found to include attitude, ability, stamina and motivation.

Other studies have been concerned with the role or the

relationship of the institution in individual productivity. Crane (1965) looked at the quality of graduate training as a determinant of the relationship between institutional affiliation and productivity. Crane interpreted her findings to indicate that those individuals who exhibit greater ability, stamina, and drive as well as more effective attitudes would be the individuals selected to attend the best graduate programs where the process of selectivity would continue to work in their favor by facilitating their gaining sponsorship by top scientists and appointments to leading universities.

A slightly different tack is taken by other researchers who have looked at the interrelationships of institutional affiliation and productivity in terms of the prestige of the doctoral institution. Caplow and McGee (1958) were perhaps the first to determine that hiring decisions were not made in relationship to an evaluation of the applicant's work but were based instead on the prestige of the individual's graduate department as well the reputation of sponsors, and chance.

Although each of the studies noted thus far have looked at different populations with seemingly different emphases, all have contributed to the knowledge base which is concerned with the factors relating to the role of individual productivity in the determination of institutional selection.

Differentiation by Institutions

Other aspects of productivity are represented by studies which emphasize the contribution of the institutional setting to the productive inclinations and capacities of faculty members. These studies have looked at the relationship of productivity and position both from the standpoint of the effects of departmental location or scientific productivity and from the standpoint of the reciprocal effects of the material factors as associated with the symbolic factors of the setting. Such studies were designed and carried out as a result of the early work of researchers such as Manis (1951), and Babchuk and Bates (1962) in which these researchers' results indicated a strong relationship between the institution at which an individual worked and the resulting productivity of that individual. Manis (1951), for example, provided the insight that the quality of the institutional affiliation was directly related to the quality of scholarly productivity. The findings of Babchuk and Bates (1962) also indicated a relationship between the contextual effect of an institutional setting upon the performance of the individual, in that the more prolific of the sociologists in their study were affiliated with major universities. Later researchers such as Crane (1970) and Hagstrom (1968) were able to propose a number of mechanisms which contributed to this institutional effect. These mechanisms were related to the fact that more free time on research is provided to those researchers who are affiliated

with the more prestigious universities. Additional advantages offered by such settings included the provision for excellent physical facilities, highly capable research assistants, and more stimulating and conducive atmospheres for carrying out research due to added social support for such activities and the functional advantage provided by the nature of the quality of colleagial interaction. Such institutions can also be seen to generate a "halo" effect which has to do with extra attention and consideration paid by reviewers and members of the field to the work of individuals at these institutions.

Once these institutional features are at work for the individual they provide powerful reinforcers for the support of future efforts which have been referred to by a number of writers. Guston (1973) talks of the personal satisfaction of creative endeavors within charismatic environments; Hagstrom (1965) refers to the collegial recognition which flows from acceptance of papers for publication as well as from the citations of published work and the awarding of research grants; Cole and Cole (1973) offer substantiation and expansion of these theories through their development of the accumulative advantage hypothesis which indicates a feedback relationship between productivity, recognition and resources. The Coles' envision this process as funcitoning through two feedback loops which contain recognition and resources as intervening variables. In the first instance, scientists recognized by others in their field as having

made important contributions will be motivated to produce additional work in order to maintain or increase publication rates and collegial respect. Aside from the more direct effects of recognition, there is the secondary institutional feature which has to do with an increased access to resources as a result of the recognition: money, time, and supportive work environments generally become more readily available through this process. Resources such as these provide not only functional value but add also to the individual's feeling of self-esteem, and serve, as does recognition, to further efforts toward productivity.

Merton (1968) saw these effects in a slightly different light. The "Matthew effect" which he describes is the process through which greater increments of recognition accrue to scientists of considerable repute while such recognition is withheld from scientists who are less well-known. Merton contends that this effect can be attributed to the overloading of scientific communication systems which lead scientists to elect to read articles and other print sources on the basis of the author's established reputation, thereby contributing further to that reputation while, at the same time, narrowing the field of recognition. Additional advantage is likely accrued through the functioning of the "halo" effect as discussed by Hagstrom (1965).

Although all of the research which has been mentioned as concerned with personal attributes, university affiliation, and productivity can be seen as intricately and importantly

related to continuing studies of individual characteristics in relation to university settings, the contrasts between the work of Merton (1968) and the work of the Coles (1973) offer the most exciting prospects in this regard. It is these researchers' work which has prompted more recent researchers (Long, 1978; Allison and Steward, 1974; Reskin, 1977; and Wanner, Lewis and Gregorio, 1981) to continue related but specific areas of study concerning productivity. Merton, on the one hand, has argued that the Matthew effect is the result of an inequitable system through which inordinate recognition is given to some scientists while deficient amounts of recognition is given to others. Conversely, the Coles have maintained that accumulative advantage works in an equitable manner, recognizing and rewarding deserving scientists while tending to relegate others to less supportive existences. This deselection process is seen by the Coles as functioning to the benefit of scientific progress.

While it is not the intent of this paper to attempt to establish the most beneficial national policy in support of science excellence, it is in the interest of providing a more complete perspective of the factors at work in university settings that the theories of Merton (1968) and of the Coles (1973) are given particular attention. The ideas presented by these researchers are of importance both because they represent a final link in the reactive chain affecting the professional careers of university faculty and because they best portray the two opposing views on

which many funding debates are based. It has been shown through the research of others that productivity and "successful" science is related most consistently with university affiliation: this phenemenon holds true through each of the professional stages. In the instance of initial faculty appointments at leading universities, these appointments are related, not as might be supposed to demonstrated personal excellence, but, rather, to earlier affiliation with a leading university. Additionally, it has been found that the same holds true with later professional stages: productivity is most dependent upon the quality of the employing university. The quality of the university, in turn, provides the resources which reinforce early professional contributions and result in special feelings of self-esteem and special recognitions which continue to build throughout an academic career. The significance of these findings notwithstanding, there are resultant underlying and nagging questions which, as yet, remain unanswered. Can we say that this process of selection does the best job of identifying persons most deserving of the rewards? Can we determine that there is a basis for the continuation, through present funding arrangements, of a few highly select universities in which there is a concentration of scientists which are designated, through the processes of affiliation, as the nation's best and most deserving of rewards? In order to confidently support such practices, our research would have to be able to identify specific individual differences which

existed prior to institutional affiliation and can be shown to be characteristic or predictive of individual differences within the context of institutional rankings of prestige. Further, we would have to be able to show that these individual differences do relate, differentially, to productivity. While it is unlikely that any but the most elaborate and complete data sets would be able to allow for conclusive determinations such as those suggested above, the most plausible way in which to gain some insight into these dynamics, given customary constraints, is to attempt to construct a composite or profile of faculty members by university designation. In this manner, comparisons can be made amongst individuals who are designated as belonging to certain categories of institutions, not with the expectation of finding individual difference but for the purpose of distinguishing important variables which seem to relate either to a conception of the "Matthew effect" or to one of "accumulative advantage." Such a profile would also be of interest in more practical matters which relate to speculation concerning the course and relative benefits of science support and promotion practices in this country.

The Present Study

The research reported here was designed to explore the characteristics of individuals who can be identified as belonging to one of three groups of university faculty as determined by a well-known ranking of institutions, the

Classification of Institutions of Higher Education, developed by the Carnegie Council on Policy Studies in Higher Education (1976). It seemed of some importance to a determination of support for either the Cole theory or the Merton theory, which is in turn central to the question of current funding practices, that all potential predictors of university placement, or, university affiliation as related to institutional prestige, be analyzed in terms of their identified role in earlier research findings and in terms of their power as predictive measures in the current study. This research extends previous work which has concentrated on a number of the aspects of productivity, but which has not provided analyses of pre-existing characteristics of individuals across all disciplines in relationship to the holding of a faculty appointment at a given type of university. Careful analysis of characteristic differences in relation to institutional prestige can be seen to be requisite to a statistical determination of productivity by university type and a relationship of important variables to productivity, as was the intent of this study.

Data and Measures

Analysis is based on data gathered by the American Council on Education (ACE) during the 1972-73 academic year (Bayer, 1973). The stratified sample included a total of 108, 722 faculty who were employed at 301 American insti-

tutions of higher education and whose names and universities, or colleges, were compiled from a number of sources including the National Faculty Directory of the American University Press Services. A four-page questionnaire was mailed to individuals at these 301 universities, four-year colleges, and community colleges, yielding 53, 034 usuable responses. The current analysis utilizes a random sample of this data set consisting of 2,530 persons who hold Ph.D. degrees and who are affiliated either with a university or a four-year college. The adoption of the standard assumption of non-consequence of faculty production rate at two-year institutions was made and these individuals were not included in data analysis procedures.

Categories of institutional levels, or, the dependent measure "institutional prestige," including only universities and four-year colleges were therefore identified. These categories were based on an aggregation of subsections of the Carnegie Commission Classifications. The Carnegie Classifications which were utilized were derived from information concerning both the amount of federal support to institutions and the number of Ph.D. degrees awarded and include the following categories: Research Universities I, Research Universities II, Doctorate-Granting Universities I, Doctorate-Granting Universities II, Comprehensive Universities and Colleges I, and Comprehensive Universities and Colleges II. It was of interest in the study to be able to differentiate individual characteristics as relating to

leading universities, or, "the top 60 research universities" in terms of the Carnegie Classification; to the remaining research and doctoral granting institutions, or, "the second-tier universities"; and to the comprehensive universities and colleges, or, "other institutions." The categories of "top 60," "second-tier," or "other" were used both individually as dependent measures in statistical procedures and were combined into one dependent measure for use in separate procedures.

Individual Characteristics

Studies which have dealt with a number of the various aspects of productivity were reviewed in order to insure that the development of profiles by university type would effectively account for important productivity variables as determined by these researchers. None of these studies have been specifically concerned with the pre-existing variables as required by this study, i.e., those characteristics of individuals which were present previous to employment; however, many have been concerned with a general determination of background features. Some researchers have tended to deal with a number of background factors as is the case in the Wanner, Lewis and Gregorio (1981) study while others such as Crane (1965) and Caplow and McGee (1958) have selected one or two specific factors to include in their studies. With respect to the requirements of this study, individual characteristics which could be seen as clearly

dealing with the situational background prior to institutional affiliation were used as were those attitudinal responses which could be considered as representative of predisposing beliefs. These variables can be grouped, for the purposes of discussion, in the following ways:

1) Pre-degree background factors, including sex, year of birth, race, mother's and father's education;
2) Pre-affiliation academic factors, including academic background, work since B.A., and prior work;
3) Career goal elements, including tenure, higher salary, higher rank, less pressure to publish, more time to research, and smaller teaching load; and
4) Attitudes, including important teaching goals, important institutional goals, and general indications of personal beliefs and self-descriptions.

The pre-degree background factors were selected for inclusion in the analysis in order to account for any effects from these sources which could be ascribed to initial or early dispensations. Wanner, Lewis and Gregorio (1981) while finding no influence of consequence of sex and race upon productivity suggest, however, a continuation of the consideration of these variables in subsequent research studies. Age, as measured by year of birth by these data, has historically been recognized as an important factor of productivity (cf. Meltzer, 1949, Axelson, 1959); and, more recently, the work of Allison and Stewart (1974) has substantiated its contribution. Both age and race were included

in this study as a result of questions which have been raised in other contexts concerning their contribution to identified differences. Statistical analysis required a utilization of dummy variables which represented female and nonwhite subjects with a value of 1. Mother's and father's education, as indicated by the number of years of schooling completed by each, are included as reflective of the socioeconomic status of the individual and of the advantage which has characteristically been assumed to be derived from this situation.

Those factors which identified academic characteristics of individuals prior to their employment at their present institution were determined to include: whether or not the master's and Ph.D. had been obtianed at this institution, the year of the Ph.D., and determination of receipt of a scholarship. A number of studies have indicated the effect of departmental prestige on later institution affiliation (cf. Cole and Cole, 1973; Crane, 1970; Hargens and Hagstrom (1967); Caplow and McGee, 1958). In the absence of data indicating institution of origin, the current study looked at the relationship of degrees obtained from present institutions to each of the three categories of institutions. Also of interest, as a possible supplement or variant of the age indicator, was the year of the Ph.D., used here to add an additional dimension to the profile. Receipt of a scholarship, while unidentifiable as to exact status and nature, can be seen as contributing to an advantage which

elements. To this end, instances of prior teaching in a university, 4-year college, postdoctoral work, elementary or secondary teaching or administration and research and development ouside an institution were included.

Career goal elements included an initial selection of a number of responses in answer to a questionnaire item, in Likert scale format, which queried the importance attached to higher salary, higher rank, tenure, less pressure to publish, more time to research, and smaller teaching loads should one be involved in seeking another position. Choices to these items can be seen to reflect current values, as well as a probable value orientation which has extended throughout the individual's professional career. Values, although little-explored by researchers for a relationship to productivity, can be appreciated in the context of the present study and explored for a significant role in determination of membership by institution category.

Consistent with an emphasis to identify all elements which could be determined to have a relationship to institutional affiliation, as scaled by prestige, other responses which were selected included indications of important teaching goals, important institutional goals, and responses to a number of questions grouped under the heading of "attitudes." The assumption is made that an individual's membership in any of the institutional groups could have been affected by his beliefs about and understanding of the importance of these indicators and the consequent "fit" of these beliefs

to the institution. Both teaching goal and institution goal elements were chosen for their ability to reflect a diversity of orientations in order to best represent the full range of individuals and institutions encompassed by the three institution designations. Following is a listing of these goal elements: develop ability to pursue research, prepare students for employment, prepare students for more education, develop moral character, develop religious beliefs, develop ability to think clearly, prepare students for family living, and convey basic appreciation of liberal arts. Responses to these items were obtained through the use of a Likert-type attitudinal scale which assigned the value of 4 to "essential" and 1 to "not important." Responses to a select number of other items were also used in this relation: "In my department, it is very difficult to achieve tenure if one does not publish," "Part-time faculty should be eligible for tenure," "Teaching effectiveness, not publications, should be the primary basis for faculty promotion," "Collective bargaining by faculty members has no place in a college or university," "I wish I had a smaller teaching load so I could devote more time to research," "I consider myself a religious person," and "Compared with most men (separate question substitutes women) of my age in my field who have had comparable training, I have been more successful." Likert scaling assigned values of 1 for strongly agree and 4 for strongly disagree.

Productivity Characteristics

The model selected for the study of individual characteristics and institutional profiles (detailed above and in Table 1) was also utilized for the study of productivity characteristics and a relationship to institutional prestige. Institutional prestige (taken as the combined variable) was hypothesized to be a good predictor of productivity. As productivity continues to be shown to be one of the best and most enduring standards by which to gauge institutional success, at the individual level, it seems appropriate that measures that have been shown to relate to individuals and institutions, by type, also be studied for an understanding of their relationship to productivity by institution type. In former studies that have attempted to predict productivity, various indications of article or book counts have been utilized. Although not wholly conclusive, the findings have served to substantiate this writer's belief in a slight advantage of the use of article counts. For this reason, as well as the nature of the data involved, article productivity, within the past two years, was chosen as the most appropriate for use as a dependent measure.

Findings: Individual Characteristics by Institution Type

Table 1, page 20, presents standardized regression coefficients for each of the independent variables. Statistical analyses were performed for each of the four

Comparison of Classification Categories and Variables Entering the Equation[a] By Standardized Regressions of Group Membership on Individual Characteristics[b]

	Institution Category			
Predetermined Variables	Combined	Top 60	Second Tier	Other
Pre-degree Background				
Sex	---	---	---	---
Year of Birth	---	---	---	---
Race	---	---	---	---
Father's education	---	---	---	---
Mother's education	---	---	---	---
Academic Backgrouns				
M.A. at this inst.	---	---	---	---
PhD at this inst.	.123**	.154**	-.095**	
Year highest degree	-.087**	-.093**	.076**	---
Awarded scholarship	---	---	---	---
Career Goal Elements				
Tenure	.044**	.053**	-.053**	---
Smaller Teaching load	-.073**	---	---	.070**
Higher salary	---	---	---	---
Higher rank	---	---	---	---
Less pressure to publish	---	---	---	---
More time to research	---	---	---	---
Work Since B.A.				
Teaching in a univ.	---	---	.099**	---
Teaching 4-yr. coll.	-.104**	-.086**	-.130**	.119**
Postdoc.	---	---	---	---
Elementary or sec.	---	---	---	.070**
Res/dev. out. ed'l insts.	---	---	---	---
Prior Work				
Teaching in univ.	---	---	---	---
Teaching in 4-yr. coll.	---	---	---	---
Postdoc.	---	---	---	---
Elementary or sec.	---	---	---	---
Res./dev. out. ed'l insts.	---	---	---	---
Teaching/Inst. Goals[c]				
Pursue research	.074**(I)	---	---	-.083**(I)
Prepare for emply.	-.062**(I)	---	.054**(I)	.067**(I)
More education	---	---	---	---
Moral character	---	---	---	---
Religious beliefs	---	-.049**(I)	---	---
Think clearly	---	---	---	---
Family living	-.067**(I)	-.065**(I)	.062**(I)	---
Liberal arts	-.048**(T)	-.057**(T)	---	---
Attitudes				
No tenure w/o pub.	.218**	.146**	.134**	-.247**
Tenure P.T. faculty	.096**	.082**	---	-.051**
Tching. effec. for promo.	-.123**	-.138**	---	.058**
No collec. bargaining	.076**	.050**	---	-.064**
Need smlr. tching. load for research	---	-.152**	---	---
Religious	---	---	.050	---
Successful (w/men)	.065**	.075**	-.054**	---
Successful (w/women)	---	---	---	---
R^2	.234	.182	.071	.156

[a]Notation of --- indicates variables which did not enter the equation. [b]Statistical criteria: F-level: 4.0, Maximum Number of Independent Variables: 80, Tolerance level: .15. $p \leq .01$** [c](T) Indicates Teaching coefficients; (I), Institution coefficients.

institution "types": Combined (all of the institution types used for the study, taken together), Top 60, Second Tier, and Other.

Given that the nature of this research dealt with an initial attempt at using secondary data for the construction of a model, or, a composite of an indicator of what people at the various universities, by category, would be like; and given, also, that F-levels of 4 were adhered to in all procedures, this writer views the seemingly modest accounting for the variance in each of the categories as representing an acknowledged first step in studying these phenomena by this method. It is perhaps reassuring to note that half-again as many variables would have entered the equation, at a .01 level of significance, had an F-level of 4 not been adhered to. The purpose of this initial research effort, however, was not seen as an exercise to improve the amount of variance explained but, rather, as a way to offer a mechanism by which many of the factors which attribute to the levels of "universitiness" could begin to be discussed in terms of funding practices and in terms of other research findings.

Variables which did enter the equation as well as those which did not are included in Table 1. It is interesting to note that none of the Pre-degree Background factors were found to be predictors of membership in any of the institution categories. This

is reminiscent of the findings of some of the more recent productivity research, but takes on even greater meaning in the context of a search for characteristics of university types. Of definite concern in recent years has been the question of sex and race advantage in acquisition of position, or, in the pursuit of "success;" these data do not show sex or race as offering an advantage in this regard. Also of little apparent consequence is the individual's age, and, as there has been distinct linkages in the past between age and productivity and productivity and prestigious institutions, it is of some interest that age did not complete the circle by being shown as an important predictor of institutional prestige. Of perhaps greater interest, however, is the lack of effect of father's or mother's education on institution affiliation; our most persistent beliefs hold that both the education of the parents (particularly of the father) and the socioeconomic status of the family (of which education can be seen to be a valid measure) are both important contributors to the future status of the individual.

Certain academic background characteristics were determinors of membership at Top 60 and Second Tier universities. Having obtained a Ph.D. at this university was a good predictor of membership at a Top 60 university, and a good predictor in a negative relationship of membership at a Second Tier university. Such a finding presents evidence contrary to established notions of university hiring practices and evidence which has heretofore gone undetected in other

as represented by the individuals employed there, are clearly uninterested in furthering appreciation of the liberal arts, religious beliefs, moral character, or family living as evidenced by the negative coefficients for these variables. Less prestigious universities are equally clear in a commitment to preparing students for employment as opposed to preparing students for the pursuit of research. A more dramatic finding is that of the positive coefficient for family living in the Second Tier equation, as well as a positive coefficient for preparing students for employment. This information is perhaps reflective of even sharper differences than has been formerly determined between the more and the slightly less prestigious research universities and carries with it greater implications than had been previously considered for individuals trained at the more prestigious universities yet accepting positions at less prestigious universities. The degree to which these individuals are required to adjust to these institutional goals is certainly a timely topic for discussion, as are ways in which such an adjustment could be attenuated or prevented. As indicated previously, however, such a discussion is beyond the scope of this paper, but is acknowledged for its relationship to the focus of this research study. Substantiation of the importance of these related issues is underscored by the study's consequent findings, as has been demonstrated through this finding and others that will be discussed.

The variables which were reflective of belief or

attitude consistently indicated the "fit" of the individual to the type, or level, of institution, as had been predicted. For example, individuals at both the Top 60 universities and Second Tier institutions perceived tenure as relating to publications whereas individuals at "Other" institutions did not. In fact, this variable, in a negative relationship, was the best predictor of membership at an "Other" university. Taken together, the attitude variables which are strong predictors of membership at a Top 60 university, perhaps best assist in determining those factors which make Top 60 people different. These individuals exhibit evidence of what I would choose to call an "entrepreneurial thread" which runs through their careers: they consider themselves more successful than other men with comparable training; they are not adverse to [that is, not threatened by] the tenuring of part time faculty but are not in favor of collective bargaining; they do not see promotion as tied to effective teaching; and they do not consider themselves religious -- seemingly, no assistance is believed to be needed by these individuals in attaining or retaining status level. These elements, which are either absent in the other institutional categories, or, are present but in an inverse relationship, taken together with the other findings, seem to be those most clearly distinguishing of the type of individual who is employed at a Top 60 institution.

Conclusions: Individual Characteristics By Institution Type

The most striking contrasts which are presented by these findings concern an absence of background data which could be determined to be effective predictors of institutional affiliation and the strength with which the attitudinal variables contributed as predictors of institutional designation. With respect to both the larger question of institutional and individual difference on which this research is based and the more specific question of a substantiation of either the "Matthew effect" or "accumulative advantage," these findings provide important insights. As concerns the first question, distinct and predisposing differences of individuals by institution type were found to be both present and not present. That is, despite the seeming reasonableness of any expectation that background variables could be found which were indicative of a predisposition to a post at a Top 60 university, none of the background variables were found to be strong predictors of Top 60 membership. The individual differences, instead, were shown to be more strictly institution-related: if an individual had received a degree from the Top 60 institution at which he or she was now employed, if the individual had not previously taught at a 4-year college, and if the distinct "entrepreneurial thread" was present, indicating a considerable reliance on "self" and an apparent belief in "self-support," then that individual

could be expected to currently hold a position at a Top 60 institution. What can be said, therefore, is that institutions continue to be shown to have a dramatic effect on the professional placement and growth of academics. And advantages such as those offered by leading universities were shown to include not only a greater chance of employment of graduates but also a greater tendency toward an enhancement of feelings of self-worth such as are evidenced by the "entrepreneurial thread." The clue to these conclusions can be found through a comparison of the Successful (w/men) variable [Compared with most men of my age in my field who have had comparable (emphasis supplied) training, I have been more successful] between Top 60 and Second Tier. The negative coefficient for Successful, at Second Tier universities, suggests that these individuals, while performing similar functions at similar, yet less prestigious universities, fail to receive extra supports which would allow them to compare themselves favorably to others with comparable training. Whether or not one chooses to draw the conclusion that those who feel less successful probably are less successful as a consequence, one would probably have no difficulty supporting the veracity of the self-reported success of Top 60 respondents and could justifiably question, therefore, the wisdom of failing to provide, through university funding schemes, adequate levels of career support to individuals of comparable training. Such support should be expected to be able to both improve the quality of the institution and the quality

of the scientific efforts of the institution, with a net effect of increasing and enhancing science quantity and quality, nationwide.

These findings also respond to the "Matthew effect"/ "accumulative advantage" question in a similar manner. Clearly, the data support the notion of an accumulation of advantage, but only at Top 60 institutions. Such an accumulation can be seen to be more an indication of advantage as based upon institutional affiliation and consequent reputation and akin to that depicted in Merton's "Matthew effect." Accumulative advantage, in the meritorious sense of the Coles' work, is less well-supported by the data in view of the fact that the advantage is tied to the most prestigious institutions, and those questions which have been raised concerning the propriety of a monopolistic support system would also serve as cause to question conclusions of merit as based on this system.

Findings: Productivity Characteristics By Institution Type

Tables 2 and 3, pages 29 and 30, detail standardized regression coefficients produced by the utilization of the "individual characteristics" model for the purposes of predicting productivity. Table 2 presents the results for the general equation in which Institutional prestige was allowed to enter after all of the other variables with an

Table 2.

Standardized Regressions of productivity on Individual Characteristics and Institution Prestige[a] At Final Step (Step 8)

Independent Variables	Beta Values	F	r
Tching. effec. for promotion	-.224**	99.58**	-.361
Success (w/men)	.204**	92.22**	.286
Convey basic apprec. of liberal arts	-.127**	35.09**	-.198
Diff. to achieve tenure w/o pub.	.083**	13.08**	.289
Tching. 4-yr. coll.	-.084**	14.80**	-.200
Postdoc.	.065**	9.36**	.128
Scholarship rec'd.	.064**	8.96**	.135
Inst. prestige	.110**	23.52**	.261

R^2 .248

[a]Statistical criteria: F-level: 4.0, Maximum Number of Independent Variables: 80, Tolerance level: .15.

p <= .01**

Table 3.

Standardized Regressions of Productivity on Individual Characteristics With Comparisons[a] of Institution Prestige[b]

Independent Variables	Top 60	Second Tier	Other
Teching. effec. for promotion	-.196**	-.331**	-.346**
Success (w/men)	.240**	.197**	.274**
Scholarship rec'd	.103**	---	---
Tching./adm. pub. sch.	-.079**	---	---
Tching. 4-yr. coll.	-.074**	-.073**	---
Postdoc.	---	.094**	---
Convey basic apprec. of liberal arts	-.194**	-.098**	---
Develop moral charac.	.076**	---	---
Prep. studs. fam. living	.087**	---	---
R^2	.190	.158	.162

[a]notation of --- indicates variables which did not enter the equation.

[b]Statistical criteria: F-level: 4.0, Maximum Number of Independent Variables: 80, Tolerance level: .15.

$p \leq .01$**

)-level of 4 had entered. Except for the addition of Scholarship received, all strong predictors of productivity are the same as the strong predictors of institutional prestige, which were discussed in the previous section. And, as had been predicted, institutional prestige itself was a good predictor of productivity.

A comparison of productivity measures by institution type can be found in Table 3. In these equations, it can be seen that characteristics of productive individuals, no matter the institution type, are very similar to those characteristics identified for membership at a Top 60 university. The strongest predictors of productivity at all levels were Success (a feeling of success) and the belief that teaching effectiveness should not be c consideration for promotion. This information suggests that individuals who are productive (have published within the past 2 years) feel themselves to be successful and are little-concerned with effective teaching goals. Various other consistencies can be noted between the predictors of productivity and the predictors of institutional placement. For example, these productive individuals have not taught at a 4-year college and are not inclined to see merit in the liberal arts. Of special interest to the present study is the fact that the variable indicating Ph.D. at this institution is nowhere present in the equations predicting productivity, yet figures prominently as a predictor of membership at a Top 60 institution.

Conclusions: Productivity Characteristics by Institution Type

Productive individuals, wherever they may be found, have very similar characteristics, as evidenced by the fact that the two strongest predictors of productivity were identical for the Top 60, Second Tier, and Other categories. Not inconsequentially, characteristics of successful individuals at all levels matched the profile of the individuals at Top 60 universities. These findings lend strong support to the less-than-popular view that funding should be more broadly-based in order to promote excellence in individuals regardless of institution of affiliation. For, what the findings seem to be showing is that enclaves of excellence can be replicated at less-than-prestigious universities; and that productivity, a powerful indicator of academic success, surfaces as a universal phenomenon, given supportive conditions for development. It can be argued that institutional placement has been shown, through the analysis of this data, to offer professional advantage and that such advantage, viewed as promoting of productivity, would not be likely to be duplicated at less prestigious institutions. It has to be pointed out, however, that, as previously noted, similar productivity profiles are presented for individuals from each of the university categories. Such a finding underscores the inability of institutional placement to account for individual productivity and leads one back to the conclusion that

regardless of the institutional type, comparable, or, universal, characteristics of productivity have been shown to be in effect. Such a conclusion seems to be strongly supportive of proposals which seek to create greater flexibility in the funding of creative efforts of university members. It can be expected that attempts will be made to promote further endeavors toward this end. Whether these endeavors are to be in the form of additional research to supplement and strengthen present findings or in the form of additional programs to explore a greater dispersion of funding, remains in question. Either tactic would be advisable. On the basis of these findings, both should be seriously considered.

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